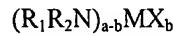


**ABSTRACT OF THE DISCLOSURE**

Metalorganic precursors of the formula:



wherein: M is the precursor metal center, selected from the group of Ta, Ti, W, Nb, Si, Al and B; a is a number equal to the valence of M;  $1 \leq b \leq (a-1)$ ; R<sub>1</sub> and R<sub>2</sub> can be the same as or different from one another, and are each independently selected from the group of H, C<sub>1</sub>-C<sub>4</sub> alkyl, C<sub>3</sub>-C<sub>6</sub> cycloalkyl, and R<sup>0</sup><sub>3</sub>Si, where each R<sup>0</sup> can be the same or different and each R<sup>0</sup> is independently selected from H and C<sub>1</sub>-C<sub>4</sub> alkyl; and X is selected from the group of chlorine, fluorine, bromine and iodine. Precursors of such formula are useful for chemical vapor deposition (MOCVD) of conductive barrier materials in the manufacture of microelectronic device structures, e.g., by atomic layer chemical vapor deposition on a substrate bearing nitrogen-containing surface functionality. Further described is a method of forming Si<sub>3</sub>N<sub>4</sub> on a substrate at low temperature, e.g., using atomic layer chemical vapor deposition (ALCVD).